Tidal Four Mile Run
Total Maximum Daily Load Study

Technical Advisory Committee Meeting
June 15, 2009

Meeting Agenda

- **Welcome and Project Updates**
  Katie Conaway, VA Department of Environmental Quality
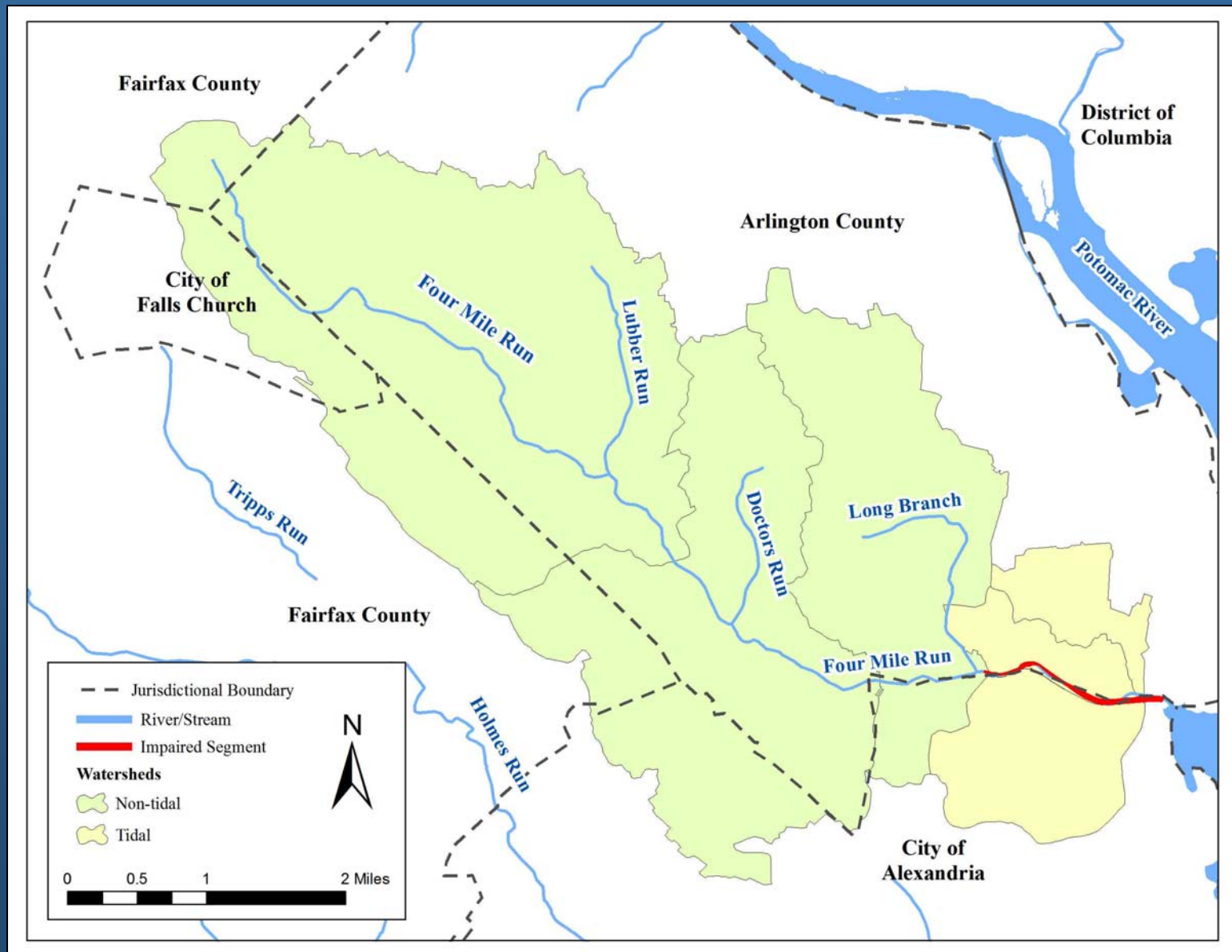
- **Review of Non-Tidal TMDL, Bacteria Source Assessment, and TMDL Development**
  Ross Mandel, Interstate Commission on the Potomac River Basin

- **Next Steps**

- **Questions**

Location of Tidal Four Mile Run

TMDL Study for Tidal Four Mile Run

- **TMDL Study Area: Arlington County, City of Alexandria**

- **Impairment: Recreational Use – exceeds the water quality standard for *E. Coli* bacteria**

Station	2006 Assessment Exceedance Rate for *E. coli* Bacteria	2008 Assessment Exceedance Rate for *E. coli* Bacteria
1AFOU000.19 GW Parkway	**40%** 2 of 5 Samples	**18%** 3 of 17 samples

2006 Assessment used data from 2000 – 2004.
2008 Assessment used data from 2001 – 2006.

Project Updates

- **Public Meeting – November 19, 2008**
- **Triennial Review of Virginia's Water Quality Standards:**
  - **If approved, Bacteria TMDLs will only have to meet the geometric mean criterion.**

Project Updates

- **EPA Approval of Proposed Boundary Conditions for Tidal Four Mile Run TMDL.**
  - Waters bordering Tidal Four Mile Run have completed bacteria TMDLs.
    - Upstream – Non-tidal Four Mile Run Bacteria TMDL, Completed 2002.
    - Downstream – Potomac River Bacteria TMDL, Completed 2004.
  - For the TMDL condition of the model, set upstream and downstream boundaries to the water quality geometric mean criterion (126 cfu/100mL).
  - Isolates the direct drainage loads to the tidal portion of Four Mile Run.

Technical Approach - Topics

- Review of Non-tidal Four Mile Run TMDL
- Source Assessment
- Preliminary W2 Model Calibration
- Project Schedule

Four Mile Run Non-Tidal Bacteria TMDL
(Northern VA Regional Commission)

- One of the first bacteria TMDLs in primarily urban watershed.

- One of the first TMDLs to base bacteria loads on Bacteria Source Tracking.

- Used Hydrological Simulation Program Fortran (HSPF) to simulate fate and transport of bacteria from 14 land uses.

Non-Tidal TMDL Results

- A 95% reduction in bacteria loads from wildlife, and a 98% reduction in loads from pets and human sources, will meet the (former) 30-day geometric mean FC standard of 200 #/ 100 ml with a 5% margin of safety.

- Implementation Plan (NVRC, 2004) targets anthropogenic sources of bacteria—no direct controls on wildlife.

Sources of Bacteria in Tidal Four Mile Run

- **Upstream Non-Tidal Four Mile Run**
- **Arlington WWTP**
- **DC Boundary**
- **Drainage to Tidal Four Mile Run**
  - **Wildlife**
  - **Human**
  - **Pets**
  - **Other**

Municipal Separate Storm Sewer System (MS4) Permits

- **Arlington County**
- **City of Alexandria**
- **VDOT**
- **George Washington Memorial Parkway**

Basis of Wildlife Source Assessment

- **Species Bacteria Production**
  - Studies in Scientific Literature
- **Habitat**
  - Naturalists Opinion; GIS Studies
- **Bacteria Source Tracking (BST)**
 - Genetic "Fingerprinting" or Antibiotic Resistance

BST and Bacteria Loading Rates

- BST used "genetic fingerprinting methodology
- 55 samples collected at 31 sites (including 3 in tidal drainage)
- Bacteria loading rates (#/ac/day) developed for fourteen land uses, based on BST, expert opinion of urban naturalists, and literature
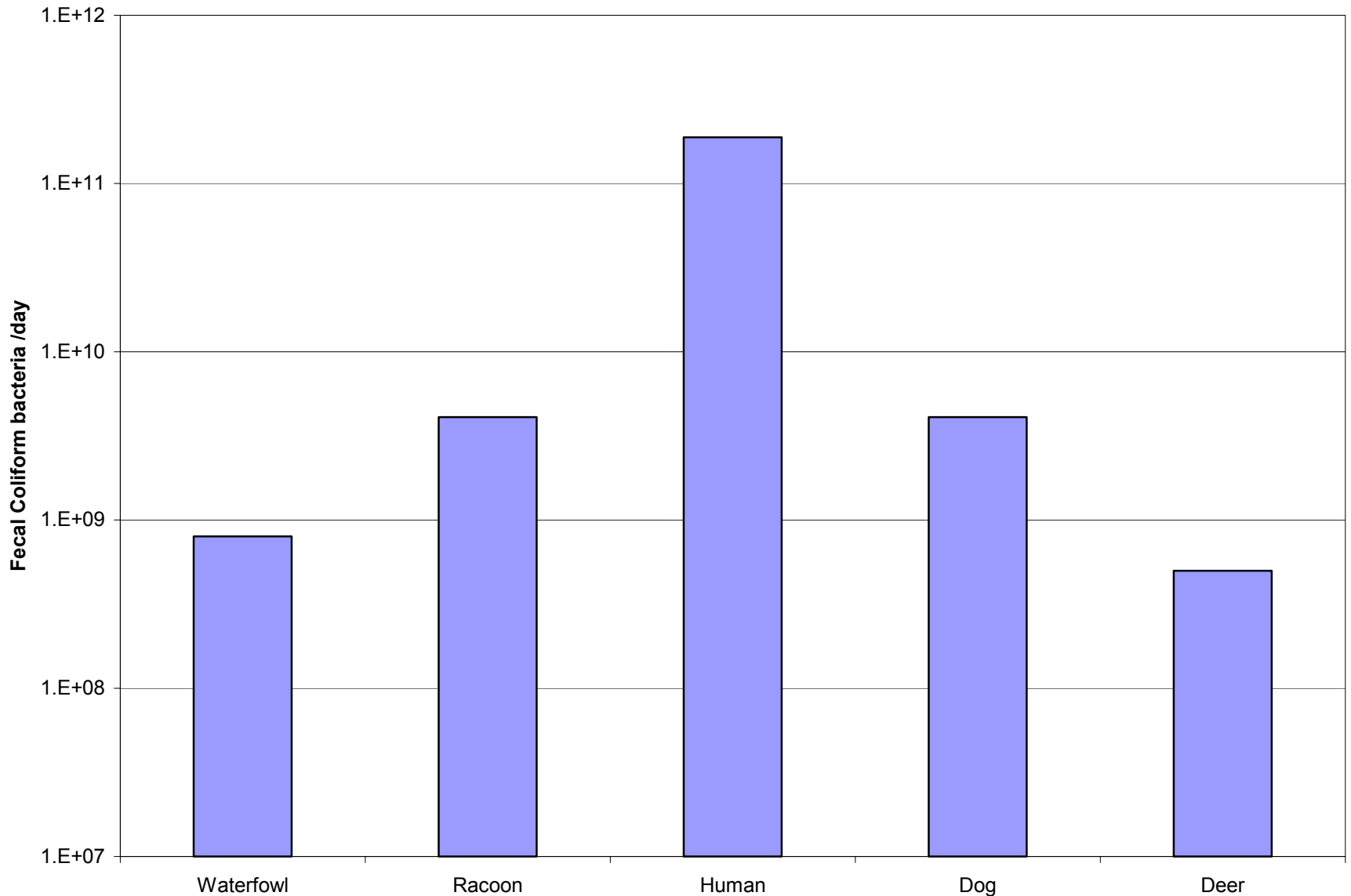
Non-tidal BST Results
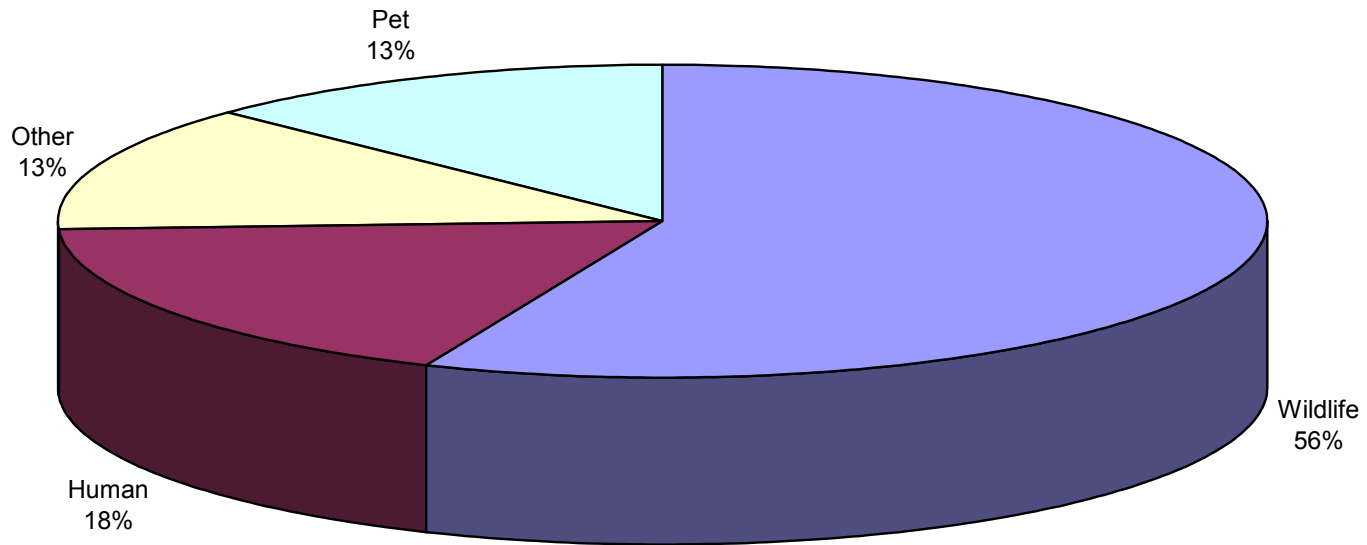
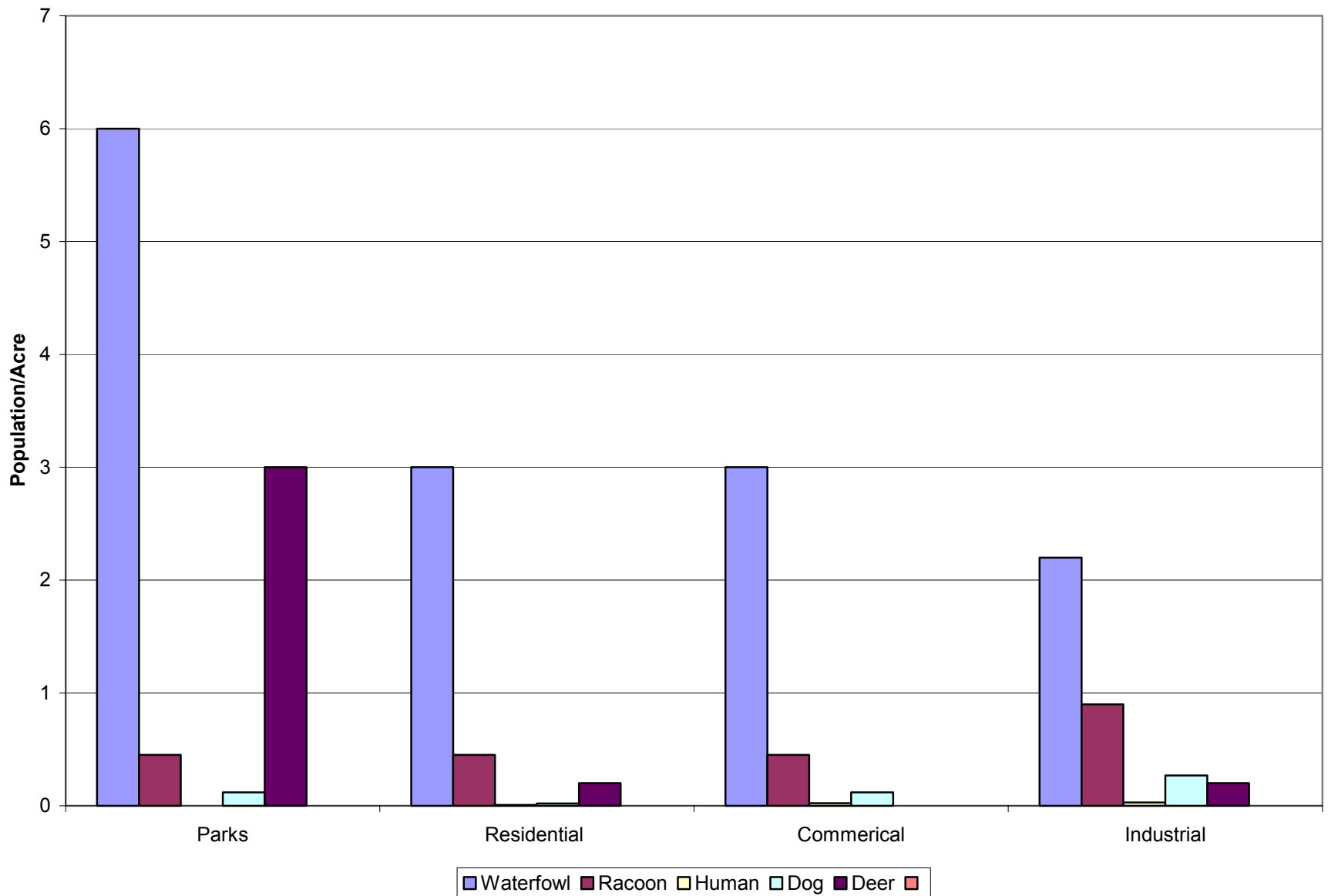# Bacteria Source Tracking (BST) Results Tidal Four Mile Run
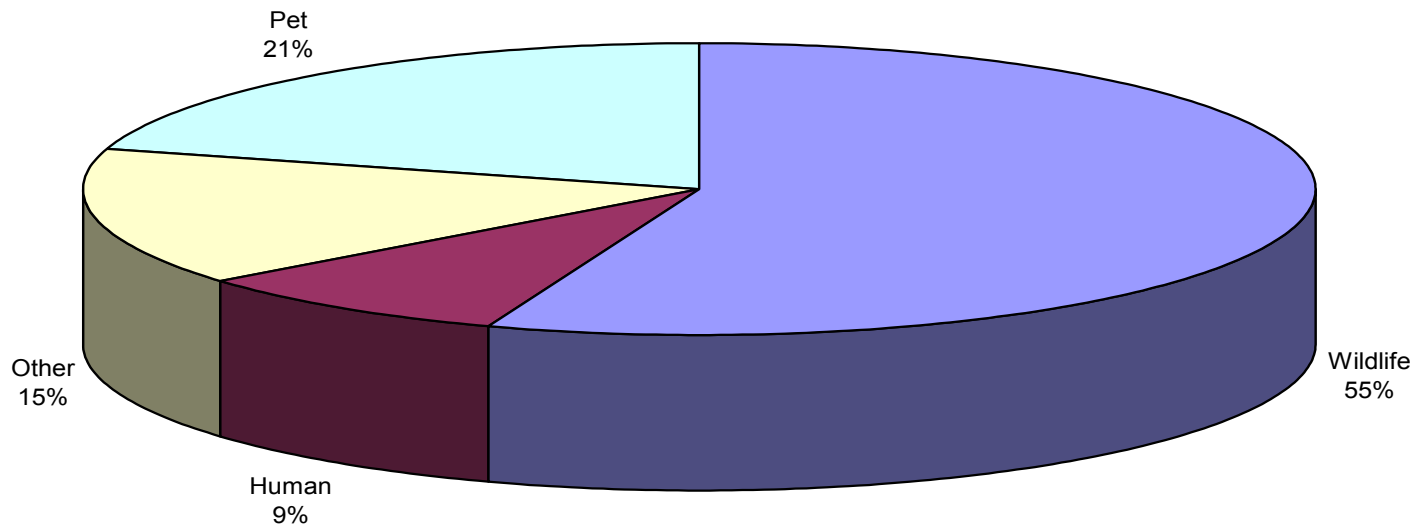
Consistent with Non-tidal BST Results

Fecal Bacteria Production Rates

Typical Population By Land Use

HSPF Model Used for Non-tidal TMDL

- **Simulates hydrology, hydraulics, and fate and transport of fecal coliform bacteria.**

- **14 land uses represented in 3 non-tidal subwatersheds.**

- **Flow calibrated against daily observed flows at USGS gage at Shirlington Road; bacteria calibrated against observations primarily from VADEQ station at Columbia Pike.**

- **Simulation period: Jan 1999 – May 2001.**

Technical Approach: Consistency with Non-Tidal TMDL

- **Use HSPF Model to represent upstream fecal coliform loads for simulation period 1/1999-5/2001.**

- **Extend non-tidal TMDL HSPF model to tidal drainage using NVRC land use and LU loading rates from non-tidal TMDL.**

Technical Approach:
Development of CE-QUAL-W2 Tidal Model

- **2-D Laterally Averaged Continuous Simulation Model.**

- **Simulates both hydrodynamics and fate and transport of bacteria.**

- **Used in VA for tidal James River Bacteria TMDL and (many other TMDLs).**

CE-QUAL-W2 Inputs

- **Bathymetry: Corps of Engineers Flood Control Design**
- **Meteorology: Reagan National Airport**
- **Tides: DC Ship Channel**
- **DC Boundary: DC Potomac Monitoring Data (Baseline Conditions)**
- **WWTP: Discharge Monitoring Reports**
- **Upstream and Tidal Drainage Flows and Loads: HSPF Model (Baseline Conditions)**
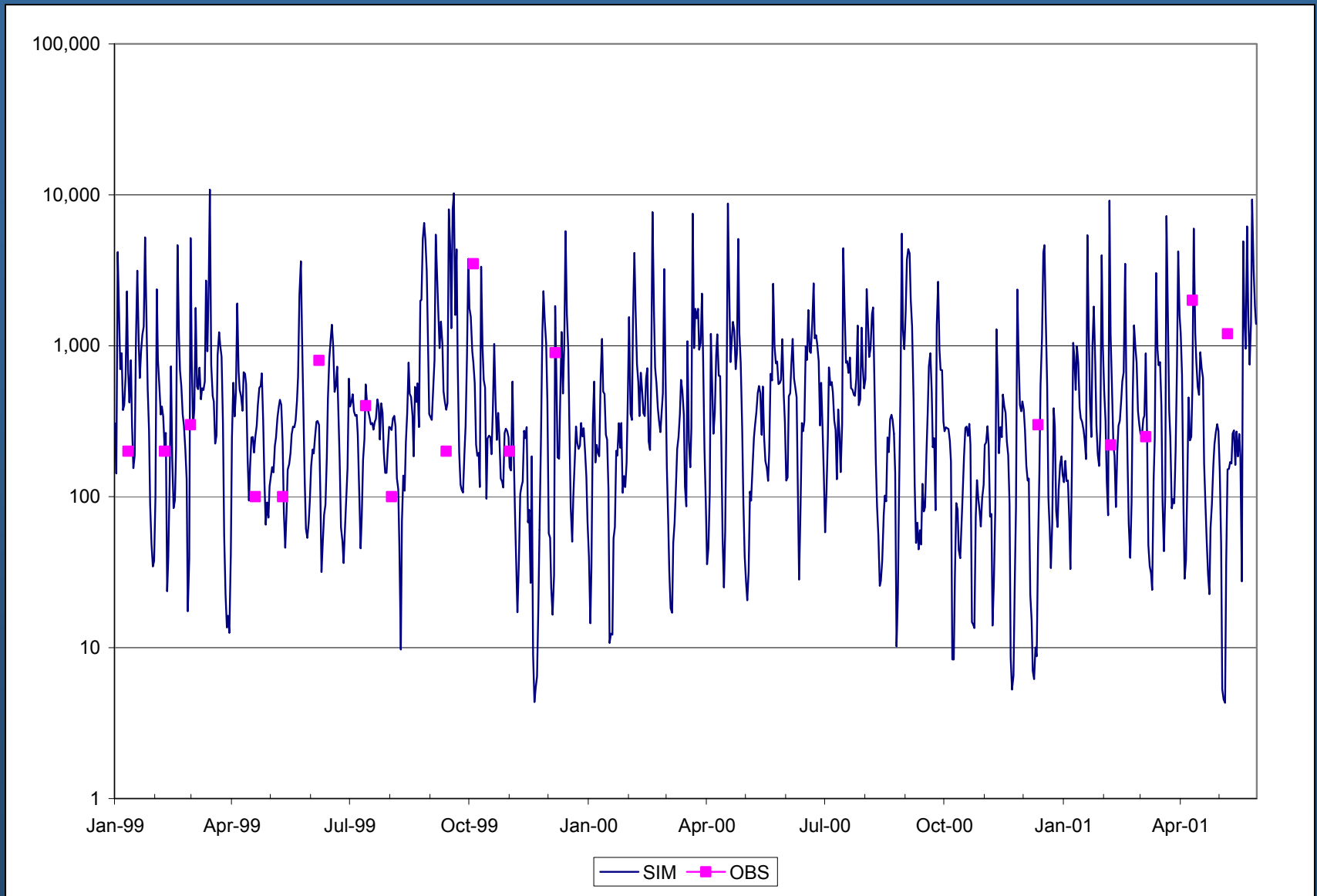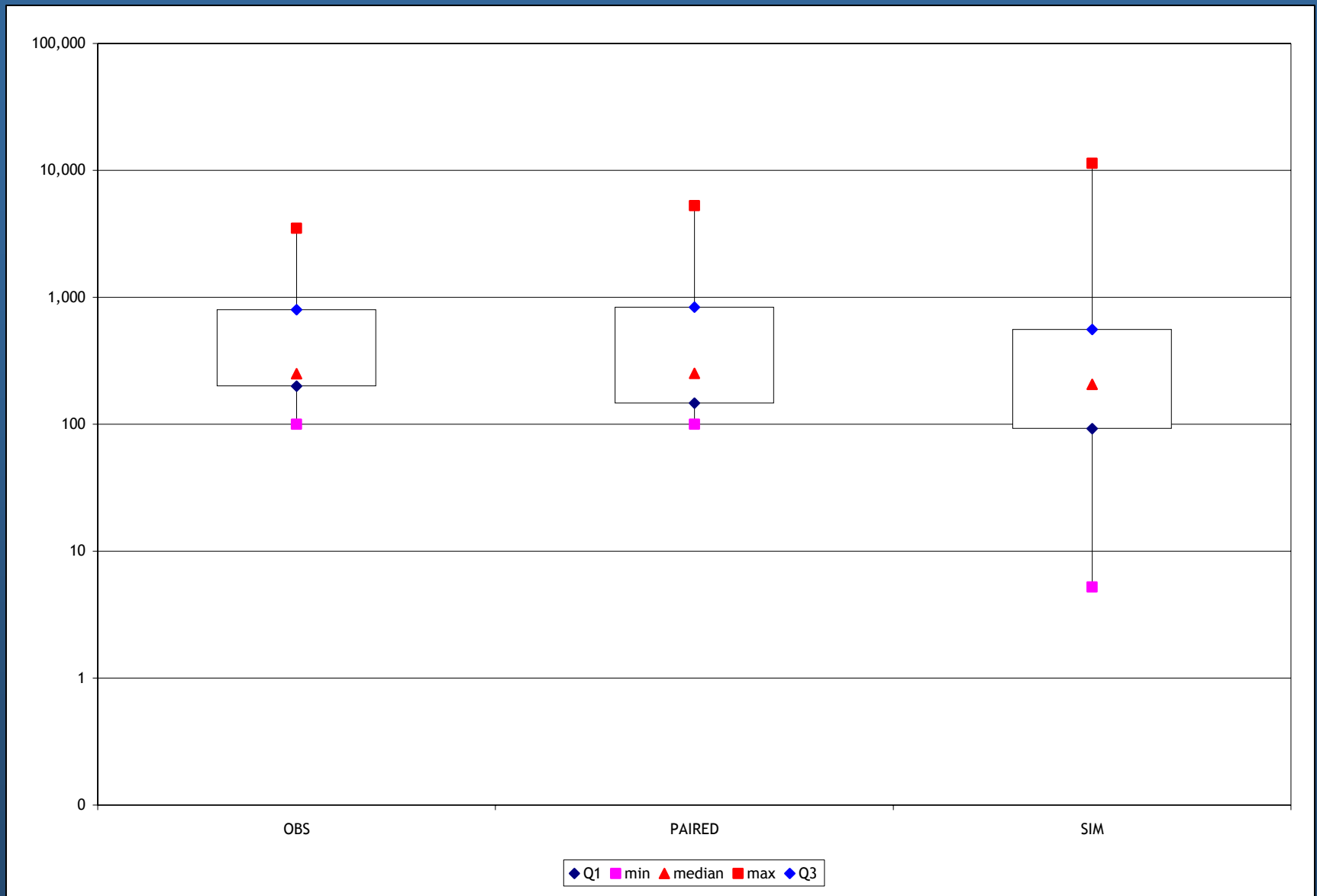
W2 Calibration Run
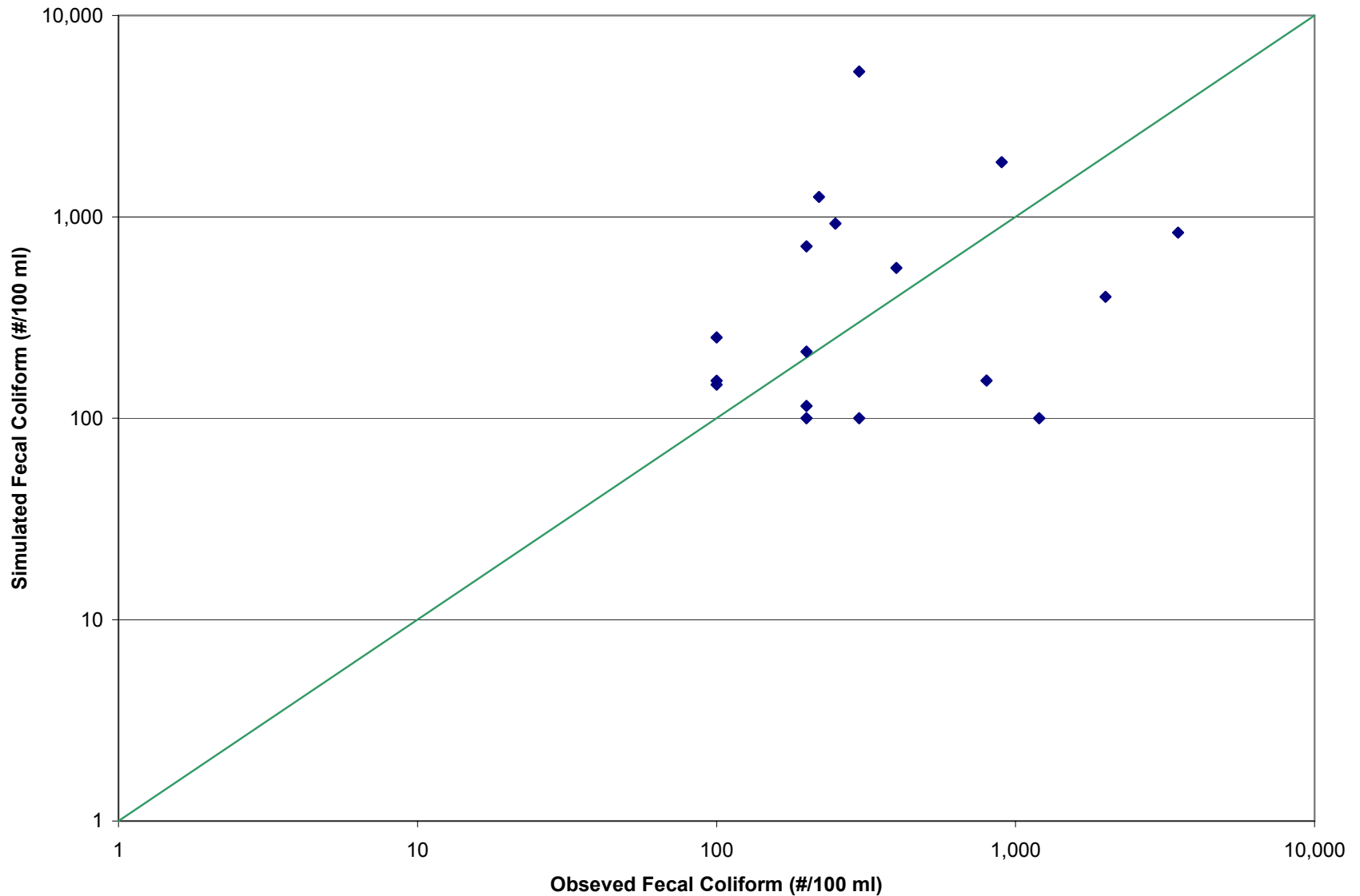
W2 Calibration Run

Tentative TMDL Scenario Assumptions

- **DC Boundary Concentration at 126 #/100 ml (DC Geomean Standard)**

- **Upstream Boundary Concentration at 126 #/100 ml (VA Geomean Standard)**

- **Arlington WWTP at 126 #/100 ml (permitted concentration) and 40 MGD design flow (+ growth)**

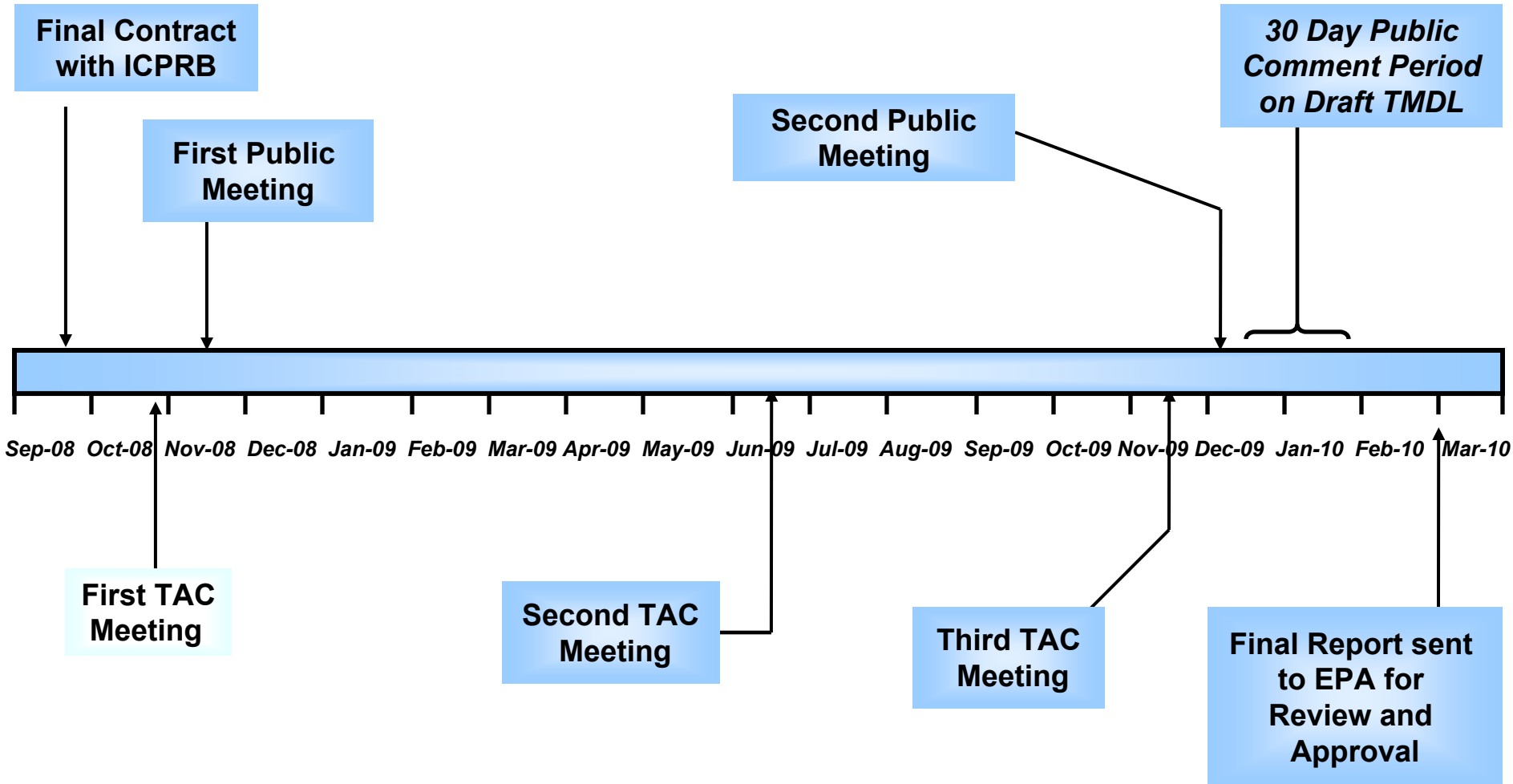# Next Steps

- **Tidal Model Calibration and Refinement**
- **TMDL Scenario Development**
- **TMDL Documentation**

Public Comment Period

Comment Period for Materials Presented at the TAC Meeting #2:

- **June 15, 2009 to July 14, 2009**

- **Comments should be submitted in writing to:**
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  13901 Crown Court, Woodbridge, VA 22193

Tidal Four Mile Run Bacteria TMDL Project Milestones

Final Contract with ICPRB

First Public Meeting

Second Public Meeting

30 Day Public Comment Period on Draft TMDL

Sep-08 Oct-08 Nov-08 Dec-08 Jan-09 Feb-09 Mar-09 Apr-09 May-09 Jun-09 Jul-09 Aug-09 Sep-09 Oct-09 Nov-09 Dec-09 Jan-10 Feb-10 Mar-10

First TAC Meeting

Second TAC Meeting

Third TAC Meeting

Final Report sent to EPA for Review and Approval

* Schedule subject to change.

C O N T A C T S

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